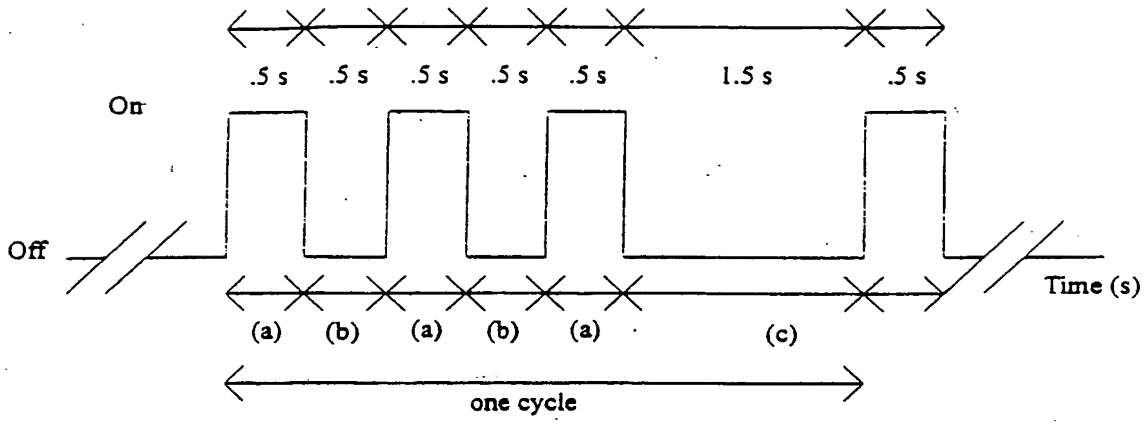

Figure 1

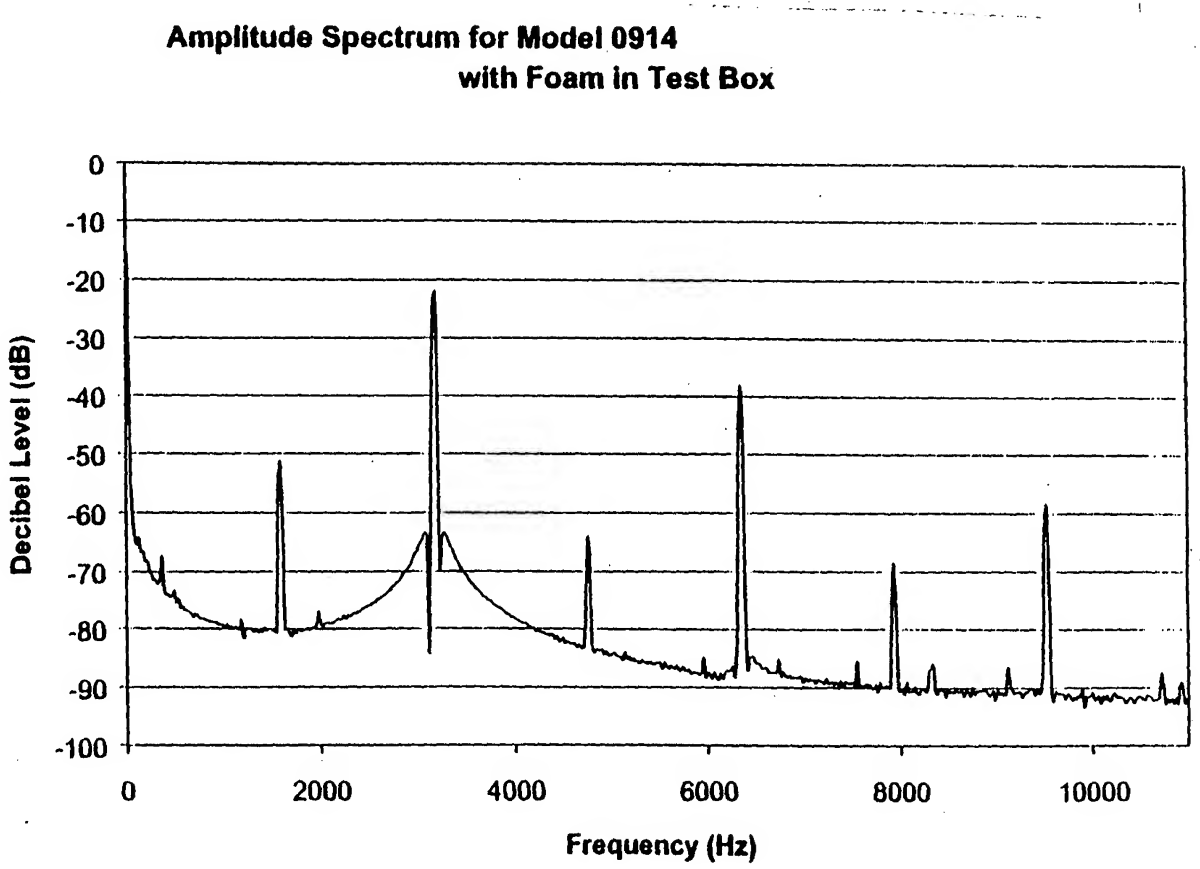
Amplitude Spectrum for Model 0914
with Foam in Test Box
Decibel Level (dB)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
2000
4000
6000
8000
10000
Frequency (Hz)

Figure 2(a)

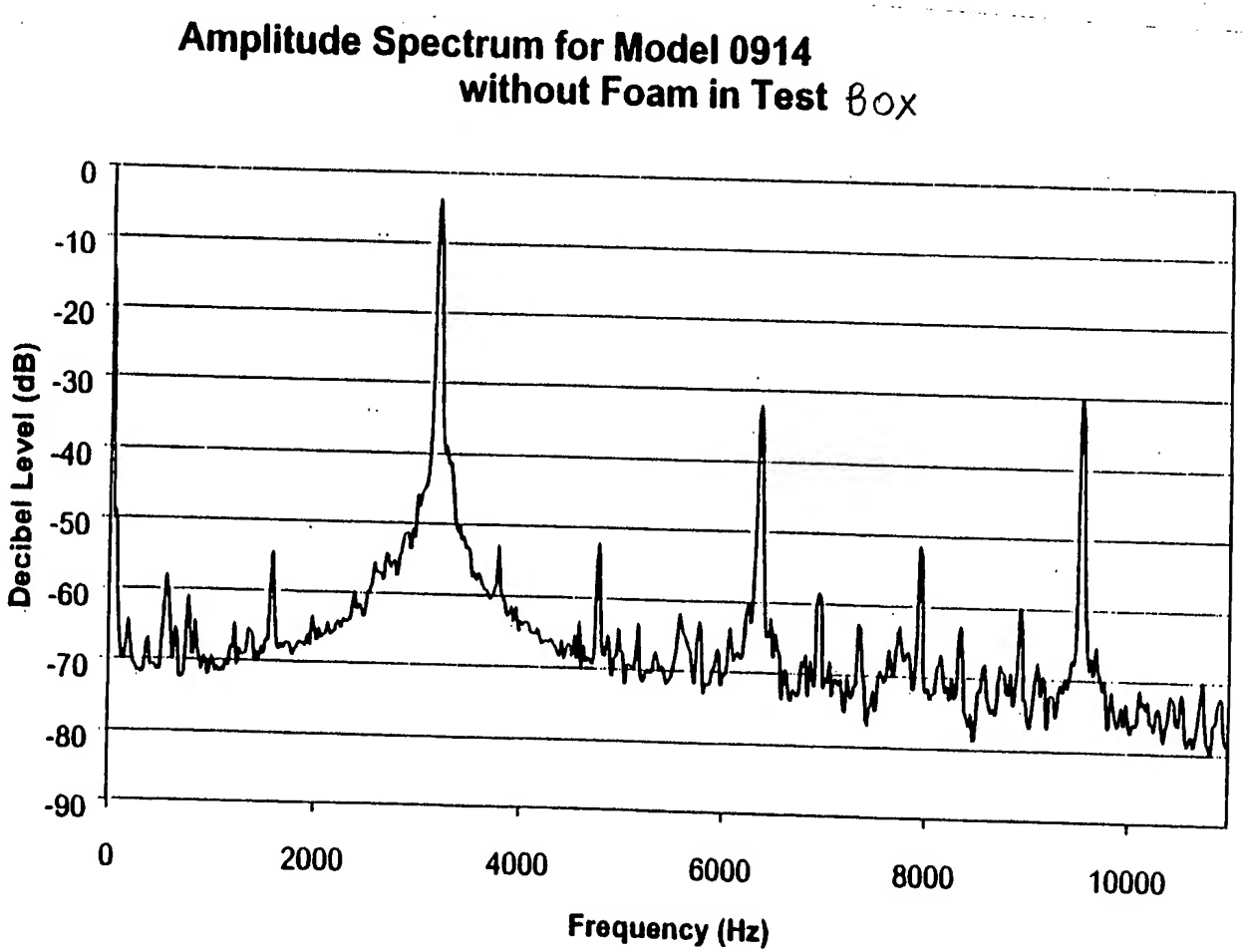
Amplitude Spectrum for Model 0914
without Foam in Test Box
Decibel Level (dB)
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2000
4000
6000
8000
10000
Frequency (Hz)

Figure 2(b)

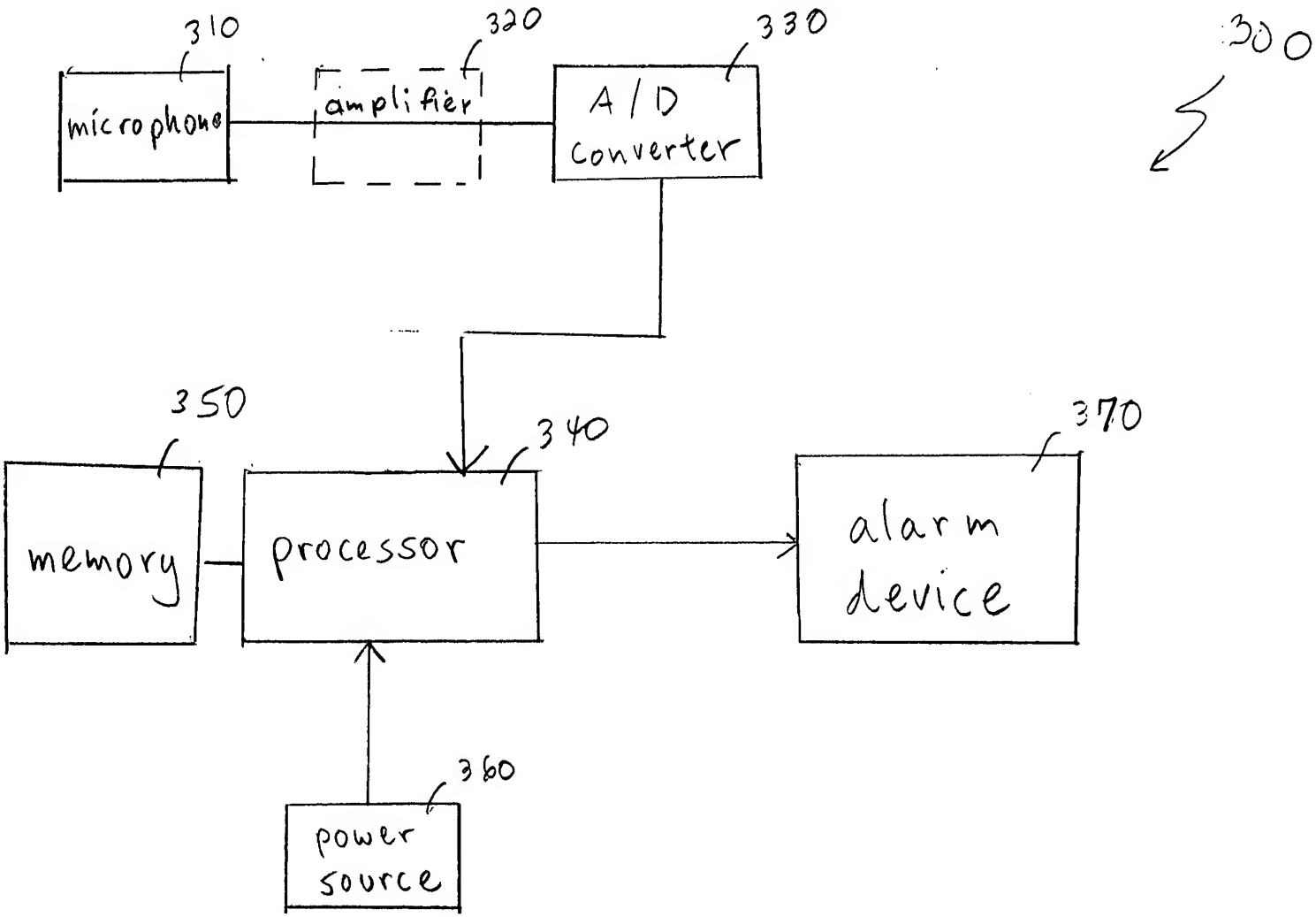
310
320
330
300
microphone
amplifier
A/D converter
350
340
370
memory
processor
alarm device
360
power source

Figure 3

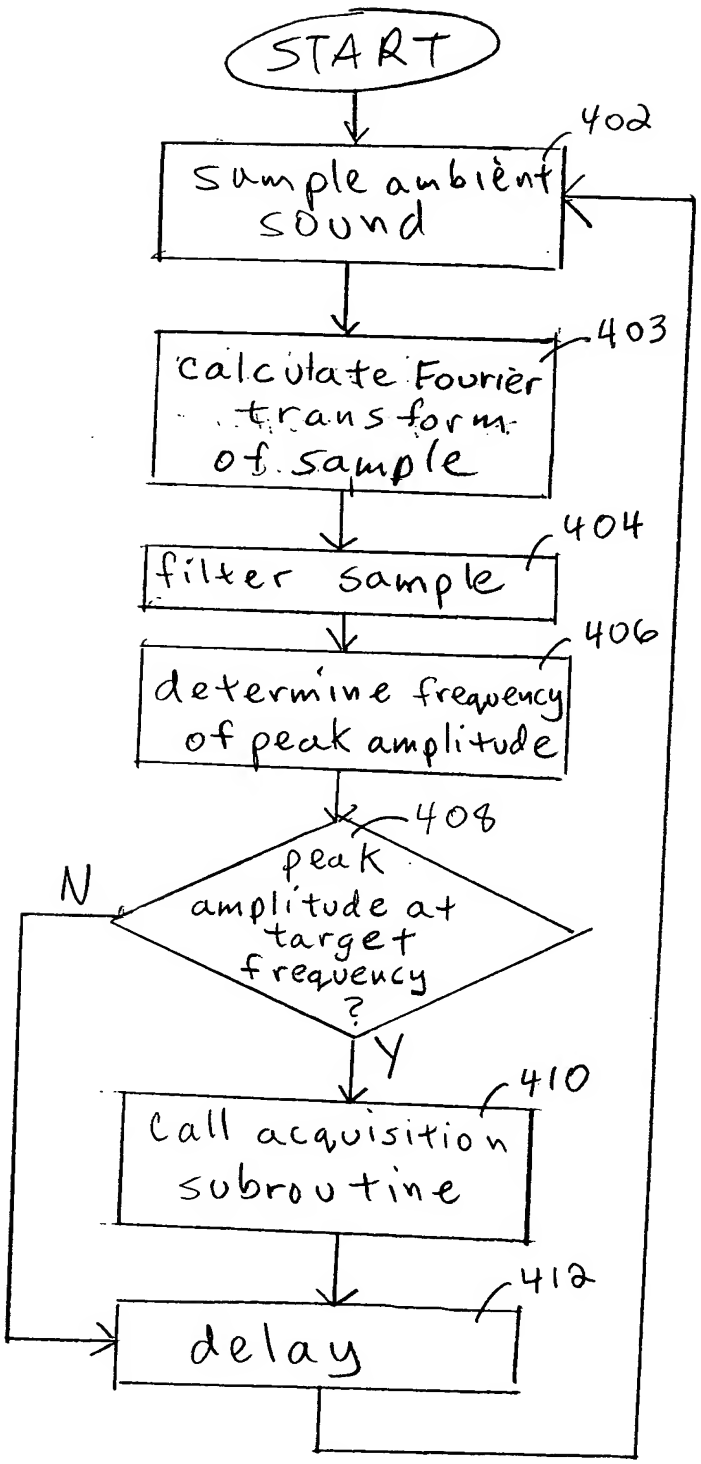
400
START
402
sample ambient sound
403
calculate Fourier transform of sample
404
filter sample
406
determine frequency of peak amplitude
408
peak amplitude at target frequency ?
N
Y
410
call acquisition subroutine
412
delay

Figure 4

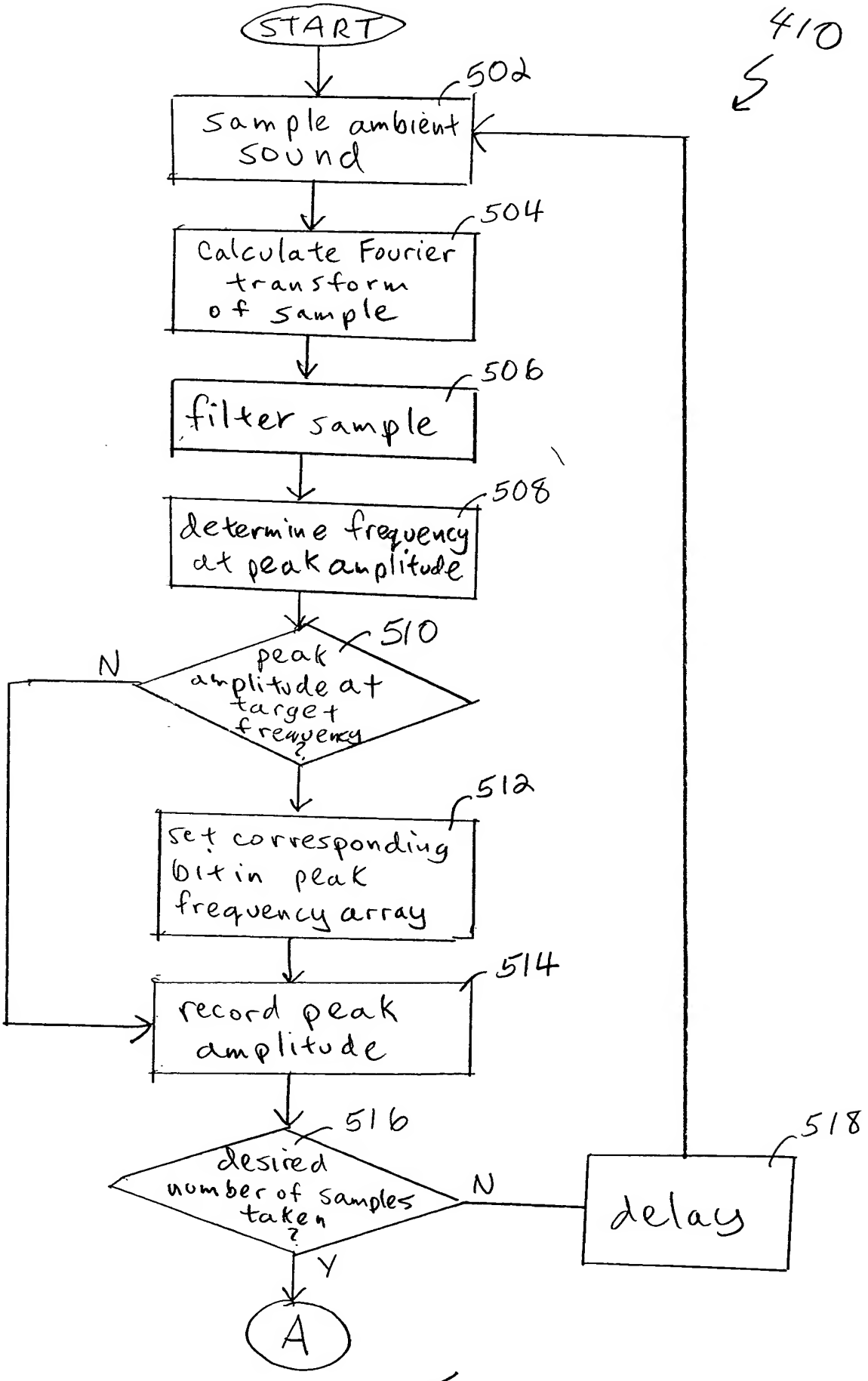
START
410
502
sample ambient sound
504
Calculate Fourier transform of sample
506
filter sample
508
determine frequency at peak amplitude
510
peak amplitude at target frequency?
N
512
set corresponding bit in peak frequency array
514
record peak amplitude
516
desired number of samples taken?
N
Y
518
delay
A

Figure 5a

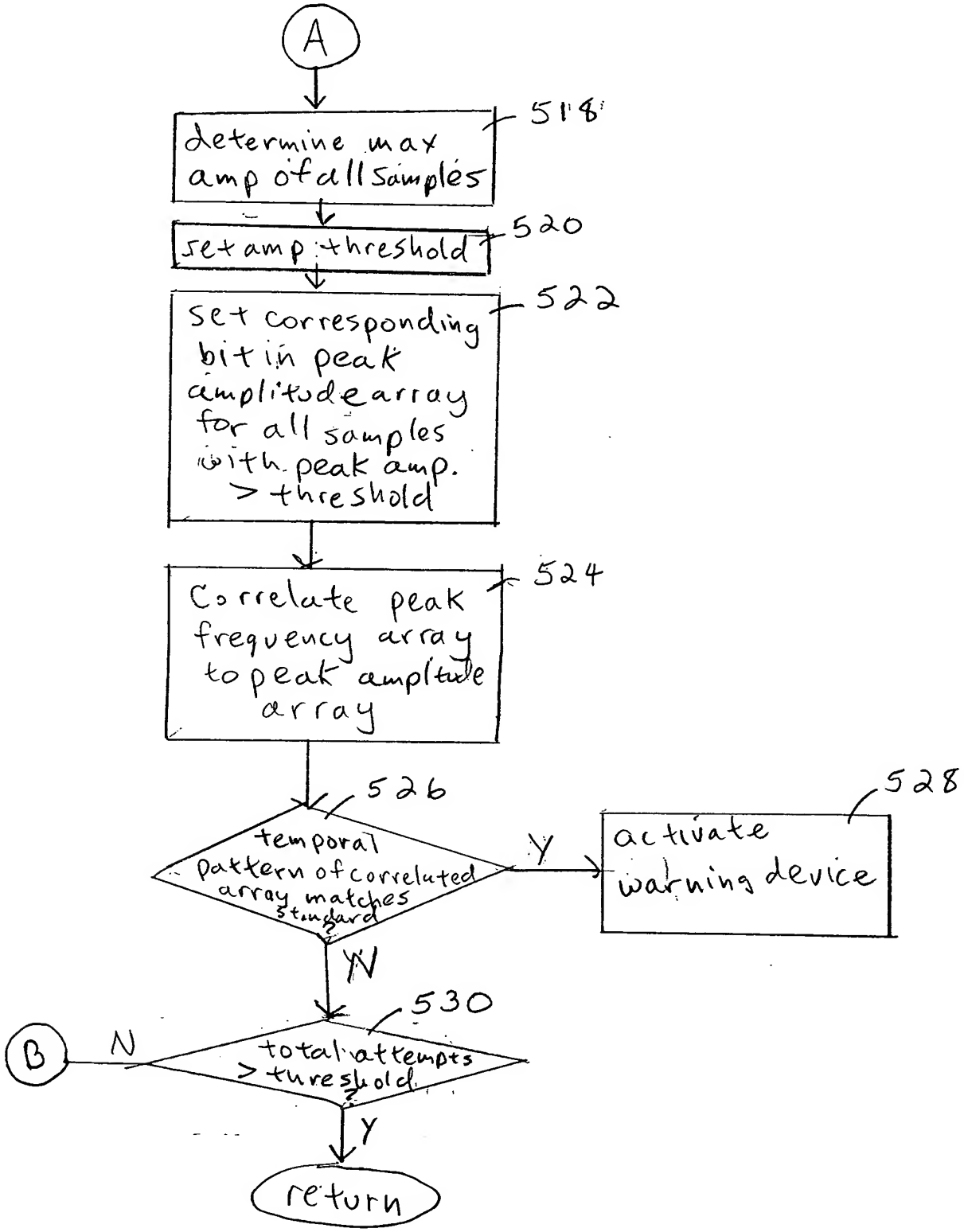
A
determine max amp of all samples
518
set amp threshold
520
set corresponding bit in peak amplitude array for all samples with peak amp. > threshold
522
Correlate peak frequency array to peak amplitude array
524
temporal pattern of correlated array matches standard
526
Y
activate warning device
528
N
total attempts > threshold
530
B
Y
return

Figure 5b

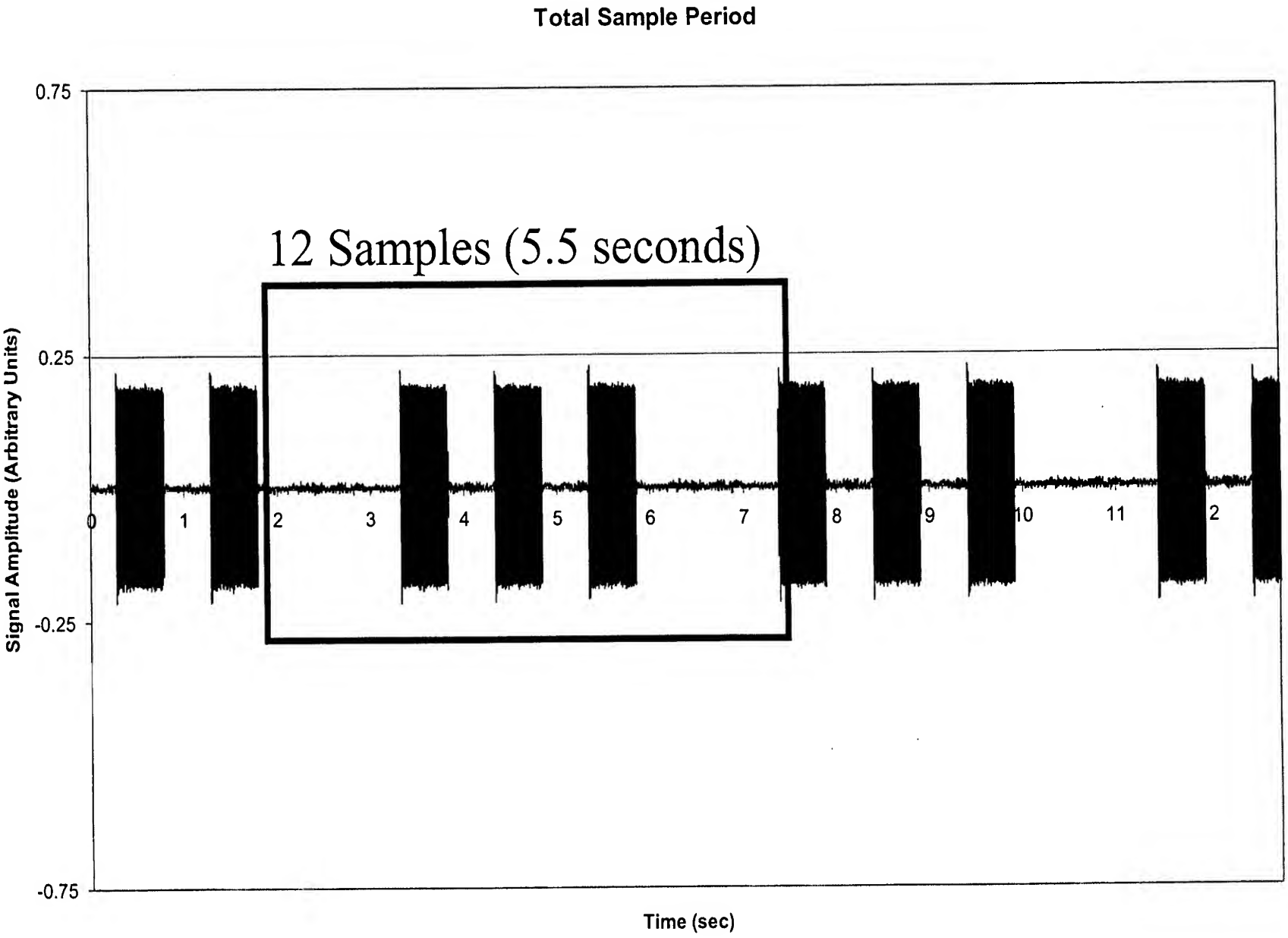
Total Sample Period
12 Samples (5.5 seconds)
0.75
0.25
-0.25
-0.75
Signal Amplitude (Arbitrary Units)
0
1
2
3
4
5
6
7
8
9
10
11
2
Time (sec)

Figure 6

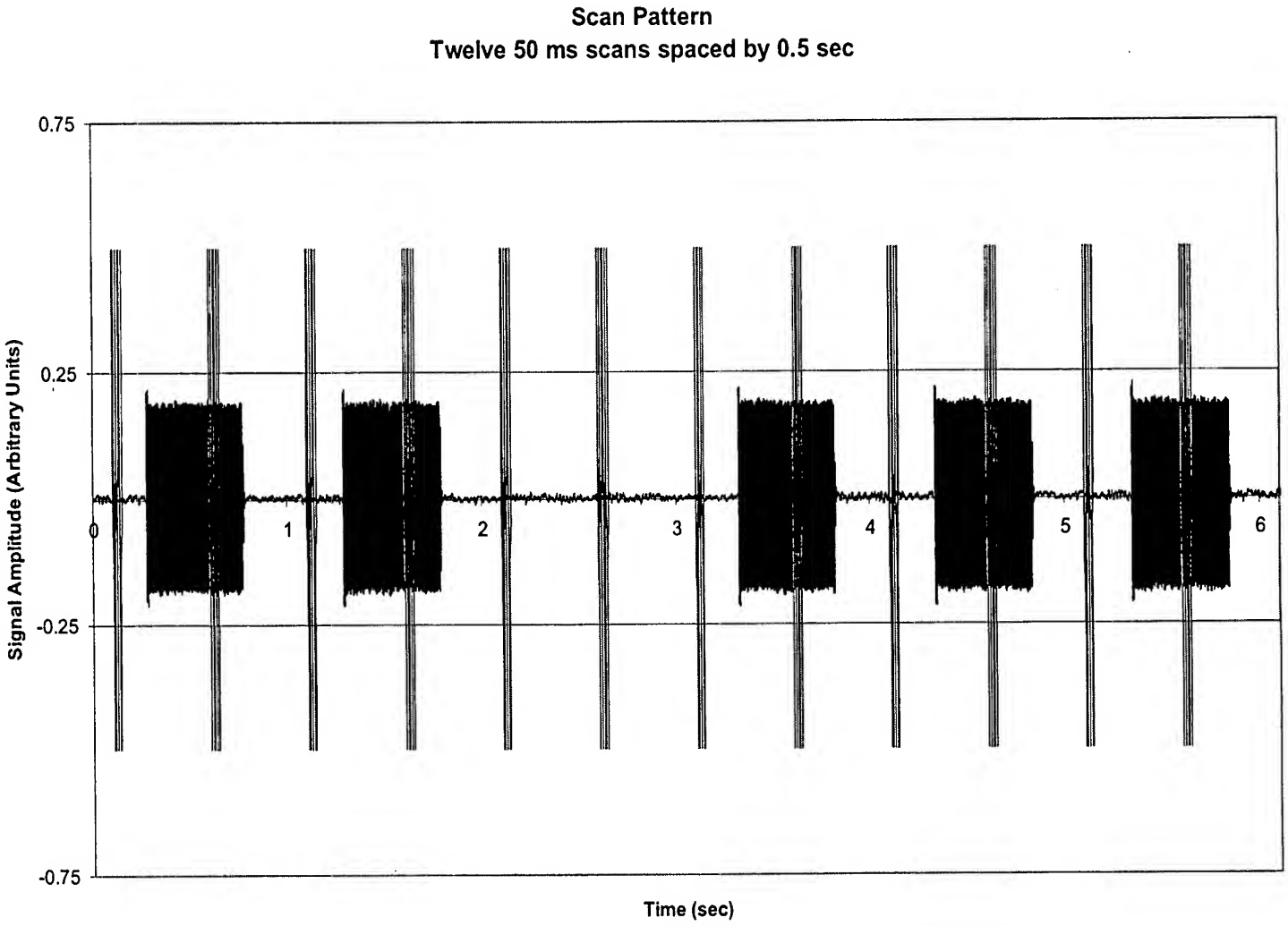
Scan Pattern
Twelve 50 ms scans spaced by 0.5 sec
0.75
0.25
-0.25
-0.75
Signal Amplitude (Arbitrary Units)
0
1
2
3
4
5
6
Time (sec)

Figure 7

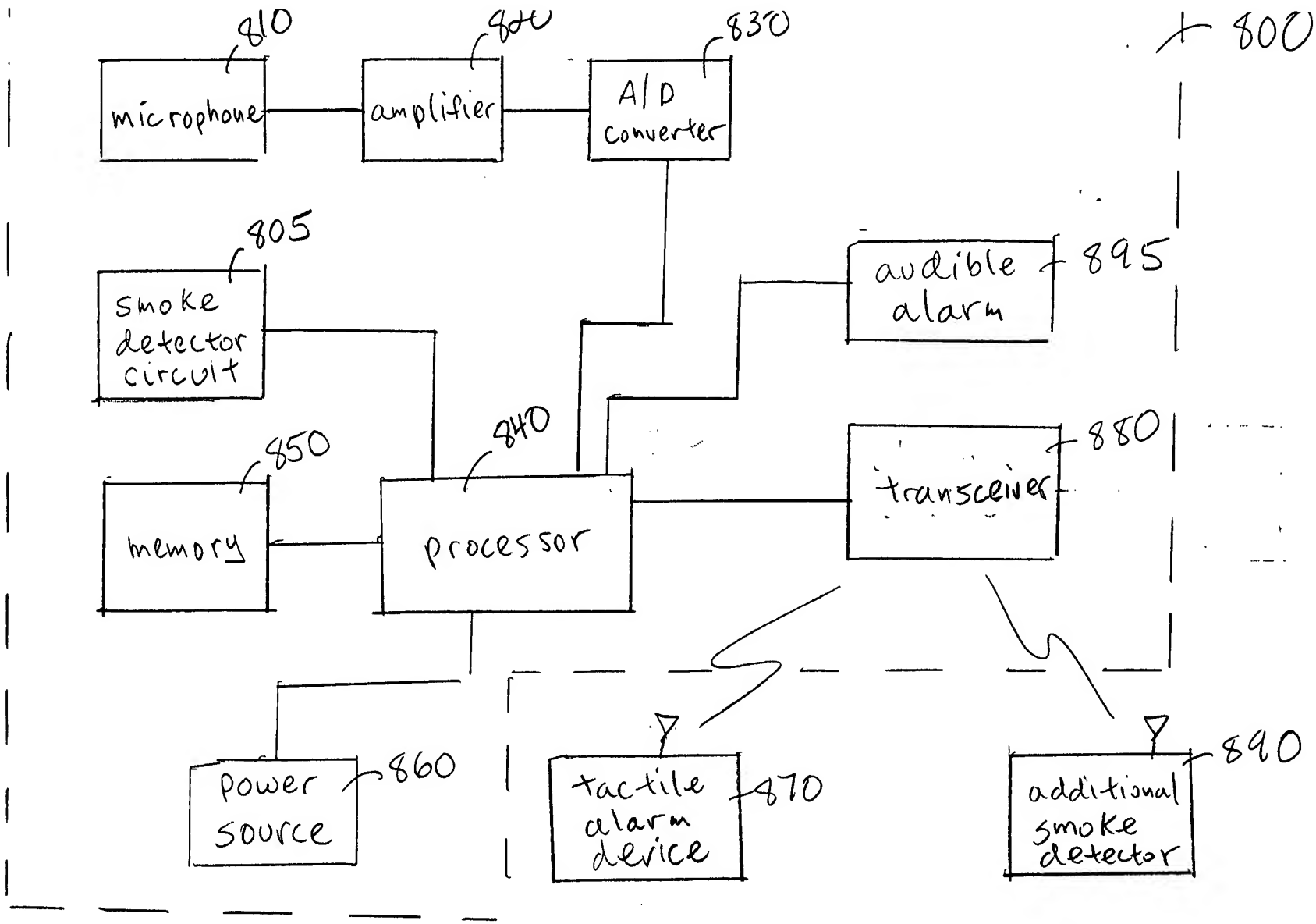
800
810
microphone
820
amplifier
830
A/D converter
805
smoke detector circuit
895
audible alarm
840
850
memory
processor
880
transceiver
860
power source
870
tactile alarm device
890
additional smoke detector

Figure 8